DOCUMENT RESUME

ED 350 987 IR 015 798

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TITLE Audio-Teleconferencing in Distance Education: The Waterloo Experience.
PUB DATE Jul 90
NOTE 12p.; Notes for a presentation at the Commonwealth of Learning Conference on the Future of Distance Education (Kingston, Jamaica, July 14-16, 1990).
PUB TYPE Reports - Descriptive (141) -- Speeches/Conference Papers (150)

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS *Audiotape Cassettes; *Distance Education; Electronic Mail; Foreign Countries; *Futures (of Society); Higher Education; Instructional Effectiveness; Lifelong Learning; *Program Effectiveness; Telecommunications; Teleconferencing
IDENTIFIERS *University of Waterloo (Ontario)

ABSTRACT

This paper describes the distance education program at the University of Waterloo, Ontario, Canada, which has been ongoing for 22 years: offers 325 courses to over 18,000 students annually; and offers three different degrees entirely by correspondence study. Issues and problems that concern the program are discussed, i.e., withdrawal rates, course quality, sophistication versus simplicity, student attitudes and motivation, independent lifelong learning, faculty attitudes and training, and pedagogical effectiveness. It is noted that the primary media used in the program are audiocassettes and print, supplemented in some cases by special kits and videotape. Descriptions are given of a small distance education project in St. Vincent (Caribbean), which is run on a volunteer basis and has awarded two BA degrees entirely by correspondence; and a computer course offered at a distance using e-mail that has had extremely high completion rates. The advantages and disadvantages of the almost exclusive use of audiocassettes versus other more innovative media are also discussed. Attachments to the notes include lists of facts about the program at Waterloo; student characteristics; procedures and types of media used; issues and problems; and advantages and disadvantages of the use of audiocassettes. (ALF)

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AUDIO-TELECONFERENCING IN DISTANCE EDUCATION: THE WATERLOO EXPERIENCE[1]

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Distance Education at the University of Waterloo: A Snapshot

-- UW is a largish (25,000 students), 32-year-old university, well known for its programs in engineering, mathematics, and computer science.

-- Its distance education program is 22 years old, and accounts for 1/5 of the undergraduate enrolment.

-- Annual enrolment in distance courses is over 18,000; UW offers some 325 courses, representing all 6 Faculties; students can earn 3 different degrees entirely by correspondence study; some honours programs are available.

-- Courses are mainly in Arts and the Humanities (with a special strength in foreign languages), but with substantial offerings too in science and mathematics.

-- Recent initiatives include collaborative development (with Lakehead University) of certificate programs in Environment Impact Assessment and Tourism and Recreation Resources Management.

-- All courses offered in distance format have been offered on campus, generally taught by the same instructor.

-- The typical distance student at UW is female, in her mid 30s, married with children, in paid employment, well-educated, lives quite close (median = 20 miles) to a university, and studies on average 8.5 hours per week; students come from across Canada, though mainly live in the large urban centres of Ontario.

-- So far 212,000 students have completed UW distance courses.

Waterloo's Approach to Distance Education

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[1] Notes for presentation to the Commonwealth of Learning conference on the future of distance education at the University of the West Indies, Kingston, Jamaica, July 1990.

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-- Study is paced, with 3 terms a year of 13 weeks.

-- Primary media are audio cassettes (which are recycled), print (texts, course notes), supplemented in some cases by special kits (e.g. slides, rock samples) and videotape.

-- Fees are identical for on-campus and distance students, with course materials for the latter being provided fee of charge; student admission and promotion procedures are also common.

-- Courses are reviewed (and if necessary reprepared) after four years.

-- Assessment is by final examination (counting at least 40% of final grade, and held at 114 exam centres across the country) plus 4-6 assignments.

-- Courses are prepared by individuals, not teams; though assistance with course design is available, it is only gradually gaining acceptance.

-- Marking assignments and exams is by the instructor or a tutor; there are no live tutorials, though many instructors provide tutorial tapes to give feedback on assignments, and students may contact the instructor/tutor by telephone (or may visit the University, if convenient).

-- Over the past two years we have encouraged establishment of regional networks, coordinated by student volunteers; each year the University sponsors an Open House for distance students, and staff arrange meetings with students where there are significant numbers in a particular community; the UW Correspondent, a newspaper for distance students, appears once a term.

-- In the past UW has experimented with residential summer schools (e.g. for laboratory work) and audio teleconferencing, but these proved largely unsuccessful.

Issues and Problems

-- Withdrawal rates from courses are typically around 35%, and it is difficult to pinpoint the cause, despite research on the problem and different intervention strategies (e.g. help with study skills, encouragement to complete missing assignments).

-- Course quality is a thorny issue, confounded by lack of incentives for faculty. Defining quality in distance education is a difficult matter, as is pinpointing the relationship between sophistication of course materials/delivery and learning effectiveness. Clearly

course content should be relevant, accurate, and up-to-date. But it is less clear that students learn more from courses that follow course design prescriptions advocated by distance education experts.

-- Costs are partly related to investment in design and different delivery mechanisms, and vary tremendously from one institution to another. Again, the relationship between development cost and learning is uncertain.

-- Sophistication versus simplicity. Schramm's distinction between "big" and "little" media is especially relevant to distance education; while sophisticated media, such as television, may be motivating and effective in communicating complex ideas, simpler media offer flexibility, which has its own appeal (e.g. reading on the bus, listening to a tape on a Walkman). Too much sophistication can also lead to "sanitised" courses that lack the personal touch of a real "warts and all" instructor.

-- Attitudes and motivation of distant learners. The conventional wisdom about distance education laments the lack of interpersonal contact between student and teacher (and among students themselves). However, experience and research at UW indicates that many distance learners choose this mode of study because it affords a mixture of flexibility and privacy. Hence only small minorities take advantage of the various opportunities provided for meeting UW staff, faculty, and other students. For this reason too UW abandoned audio teleconferencing, although this was never attempted on a mandatory basis.

-- To what extent does distance education foster independent lifelong learning? For example, to what extent does the self-contained package discourage student-directed problem-solving, using the tools at hand in the local environment? And to what extent should students be forced to engage in interaction and debate? This may be less of an issue in the case of the large Canadian distance teaching universities where few students complete an entire degree by this means, and frequently combine distance study with conventional course work. But for isolated students in the Caribbean, lack of opportunity for interaction may be a major limitation.

-- Faculty attitudes and appropriate training for distance teaching. In dual-mode institutions faculty are rarely recruited for their skills in distance teaching (or for teaching skills at all). Yet the abilities needed to develop and deliver distance courses may be quite different from those needed in a live class. For example, because of student isolation, much greater emphasis must be given to providing full and helpful feedback on student performance. At the same time faculty typically enjoy considerable

autonomy in teaching, and will inevitably resent too much prescriptive advice about course preparation and delivery. Furthermore, the problem may well be compounded by lack of rewards for effort put into distance teaching -- e.g. compared to rewards for traditional instruction, supervision of graduate students, or research. Similar attitudes may hamper use of distance courses developed elsewhere. On the other hand using regular faculty for distance teaching may enhance the prestige of the program.

-- Pedagogical effectiveness. Do distance students perform as well as on-campus students? This is almost impossible to determine because of methodological problems in conducting valid studies (e.g. different student populations, difficulty in controlling all the possible variables, etc.). However, tentative evidence from comparative studies at UW seems to indicate that where there are comparable courses and similar exams distance there is greater dropout among distance students but those remaining in the program perform as well as students in the on-campus version of the class.

The UW/St. Vincent Project

For the past 5 years UW has been involved in a small distance education project in St. Vincent, in which about a dozen local students have taken UW correspondence courses. The program is run on a volunteer basis, with UW faculty taking on the Caribbean students as overload, and teachers from a St. Vincent high school acting as coordinators on the Island. Students pay a nominal fee to the University, which absorbs all administration costs. While there have been some dropouts from the program, 2 students have been awarded BAs (entirely by correspondence), and a further 4 should graduate in the near future. For the most part, students enroled are teachers or civil servants. Their success in the program (and especially their rapid progression, averaging 6 courses a year) in some ways defies the logic that distance teaching should be carefully tailored to the needs of students in a particular culture.

Technology in Distance Education: A Recent UW Initiative

Despite Waterloo's reputation as a technologically innovative university, our approach to technological innovation and distance teaching has been extremely conservative. Perhaps the major change in 2 decades has been the move from reel-to-reel tape to cassettes! This is partly because of cost, but also because of fears that adoption of certain technologies will reduce our flexibility, and limit access and effectiveness. Hence we have been reluctant to embrace technologies that require students to be in a particular place at a particular time (such as live tutorials, audio teleconferencing, live television). We have recently begun to use videotape, but

only as supplements to print and audio, and only to communicate concepts and material that require a moving image.

We have begun to use computers in distance teaching, but only after carefully considering exactly what pedagogical role they might best fulfill. Hence we rejected the use of the computer as the principal instructional medium (as in CAI) and instead used the technology to tackle one of the weak spots in our program -- the communication between students and instructor, especially surrounding assignments, where a tight timetable (dictated by our short 13-week term) and the unreliability of Canada Post, means that students often experience considerable delays in getting back marked assignments.

Use of computer communication in distance education was first developed for CS 100, a course that introduces students to a number of computer applications, ranging from word processing to programming. With a donation of equipment and funding from Toshiba, a special distance version of the course was prepared comprising the usual audio tape and print components, but with the addition of a set of computer-based exercises that students completed as assignments relating to the various applications being taught. Each student was loaned a laptop computer and printer, and supplied with appropriate software. Assignments were completed on the laptop and sent to the instructor via electronic mail (accessed through the normal telephone attached to the computer's inbuilt modem). Instructor feedback on assignments was communicated to students in a similar manner. The course is now offered on a regular basis, with enrolments of 50 students in any term. Completion rates have been extremely high. Future plans involve using the electronic communications protocol in other (non-computer) courses, and adaptation of CS 100 for use on any DOS-based machine.

Conclusions

Advantages of audio teleconferencing include the following:

-- Provides personal and immediate contact between instructor and students,

-- Combats the "loneliness of the long-distance learner",

-- Stresses oral communication which may be less intimidating than print or TV, especially in developing countries,

-- Is cheaper than some media (e.g. live TV),

-- Builds on the oral tradition common in universities and

hence is "easy" for faculty to handle,

-- The teleconferencing network, once established, can also serve other useful purposes, such as continuing education and professional communication, updating.

Disadvantages:

-- May not be possible at all for some students who have no access to a local site or phone (and hence jeopardises access and equity),

-- May place too much emphasis on oral communication, and in particular may neglect the dominant academic medium of print,

-- Some students may not like the interactive element and be reluctant to participate fully,

-- Is harder to organise and use effectively than many faculty may realise (e.g. to ensure full student participation),

-- Communication costs may be high when long distances are involved,

-- Real-time communication is inflexible compared to, say, audio tape or print,

-- Is teacher-centred and may discourage independent learning if students rely too heavily on conference sessions as "classes".

In short, audio teleconferencing can be a useful component in distance teaching, but I am dubious about a system in which it is the only component. To paraphrase McKenzie King, "audio teleconferencing if necessary, but not necessarily audio teleconferencing".

DISTANCE EDUCATION AT WATERLOO: A SNAPSHOT

* Distance program began in 1968

* 18,000 student courses - 20% of undergraduate enrolment

* 212,000 students have completed UW distance courses to date

* 325 courses, 3 degrees, some honours

* Arts, Humanities, Science, Math

* Certificate programs in environmental impact assessment and tourism management

* Common instructor for on-campus and distance courses

STUDENT CHARACTERISTICS

* 56% female; average age 33

* 67% married, most with children

* 79% employed, most full-time

* Most white collar, 30% teachers

* 77% from Ontario, 37% in large city

* Median miles from a university = 20

* 29% have some university, further 30% have a degree (40% for males)

* 53% aiming for degree, 26% study for interest, 15% for upgrading

* Study time per course 8.5 hours (range 0-40 hours)

* 87% very satisfied with distance study

THE WATERLOO APPROACH

- Paced program, 3 terms a year
- Audio cassettes, course notes, text
- Some use of kits and videotape
- Same fees and criteria as for on-campus
- Course review after 4 years
- Assessment by final exam (40%) and 4-6 assignments
- Autonomous instructor, limited course design
- Extensive use of tutors for marking
- Student communication strategies
- Experience with summer schools and teleconferencing

ISSUES AND PROBLEMS

* Withdrawal rates
* Course quality
* Sophistication vs simplicity
* Student attitudes and motivation
* Independent lifelong learning
* Faculty attitudes and training
* Pedagogical effectiveness

SOME CONCLUSIONS

Advantages:

* Personal and immediate contact
* Oral communication more friendly
* Cheapish
* Builds on university oral tradition

Disadvantages:

* Neglects alternative media, e.g. print
* Some students resist participation
* Faculty may underestimate difficulties
* Communication costs
* Inflexibility of real-time communication
* Teacher-centred